

**REMARKS**

Applicants respectfully request consideration of the subject application. Applicants amended paragraph [0008] of the specification to more clarify subject matter already present in the specification. Therefore, Applicants added no new matter to paragraph [0008].

Claims 1, 2, 4, 5-9, 13, 17, 18, 21, 24, 25, 28, and 34 have been amended. Applicants canceled claim 3 without prejudice. No new claims have been added. Applicant amended the claims to more particularly point out the subject matter of the claims and added no new matter through the amendments.

**Allowable Subject Matter**

Applicants thank the Examiner for pointing out that claims 28-33 would be allowable if rewritten or amended to overcome the rejections under 35 U.S.C. §112, second paragraph.

**Claim Rejections – 35 U.S.C. § 112**

Claims 1, 2, 8, 9, 18, 24, 25, 35, and 36 have been rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Applicants amended claims 1, 2, 8, 9, 18, 24, 25, 35, and 36 to more particularly point out the subject matter of these claims and did not add new matter through the amendments.

Claim Rejections - 35 U.S.C. §103(a)

Claims 1-10 and 34-37 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Walton et al. "Practical Multicasting on a Nonbroadcast Subnetwork" ("Walton") in view of U.S. Pat. No. 6,118,785 to Araujo et al. ("Araujo") and in further view of U.S. Pat. No. 6,977,906 to Owens et al. ("Owens").

Claims 11 and 12 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Walton et al. in view of Araujo and Owens and in further view of U.S. Publication No. US 2004/0240466A1 to Unitt et al. ("Unitt").

Claims 13-16, 21, and 24-27 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Walton in view of the Applicant's admitted prior art ("APA"), Araujo, and Owens.

Claims 17 and 18 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Walton et al. in view of Araujo et al. and Owens et al., and in further view of U.S. Pat. No. 6,891,825 to O'Dell et al. ("O'Dell").

Claims 19 and 20 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Walton et al. in view of Araujo, Owens, O'Dell, and in further view of Unitt.

Claims 22 and 23 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Walton in view of the Applicant's APA, Araujo, Owens, and in further view of Unitt.

*Claim 1*

Claim 1 requires determining a Point to Point Protocol over Ethernet (PPPoE) client to be multicast capable upon detection of a PPPoE multicast capable tag in a PPPoE active discovery request (PADR) received from the PPPoE client. Furthermore, claim 1 requires transmitting the multicast traffic for the layer 2 multicast address as PPPoE multicast traffic in a single PPPoE multicast session from a network element to a consumer premise equipment coupled to the PPPoE client.

Walton describes implementation of multicasting over a Myrinet subnetwork. (Walton, pg. 251). Many hosts connected together in a mesh configuration to form a Myrinet subnetwork. One host on the Myrinet subnetwork is also connected to the internet. (Walton, **Figure 3**). The host runs special software for mapping IP multicast addresses to Myrinet multicast cycle numbers of multicast packets. (Walton, pg. 254). The packet is then forwarded multiple times amongst the Myrinet subnetwork. (Walton, pg. 252). To join a multicast group, a host uses an IGMP packet. This IGMP packet notifies the host connected to the internet that it is multicast-capable. (Walton, pg. 255). All these multicast-capable hosts on the Myrinet subnetwork are then used to create a multicast cycle. (Walton, pg. 255).

A host on a Myrinet subnetwork that forwards IP multicast messages according to Walton is an end user and does not describe or suggest PPPoE multicast traffic in a single PPPoE multicast session from a network element to a consumer premise equipment coupled to a PPPoE client as required by claim 1. Furthermore, using an IGMP packet to notify the host on a Myrinet subnetwork of

multicast capability is not a PPPoE multicast capable tag in a PADR.

Araujo describes a communication protocol designed for managing the communication between peers that includes a signaling channel in frames formatted according to the communication protocol. The signaling channel is utilized by intermediate devices in the access provider network, such as central office switches or other concentration points in the network to facilitate the management of the flow of data traffic in the access providers network. The signaling channel is identified in the intermediate devices and in the end stations, such as customer premises equipment or remote access servers. (Araujo, Abstract). The signaling channel allows the concentration/multiplexing equipment to become a distributor point for multicast feeds. (Araujo, col. 15, ll. 3-13). Moreover, Araujo describes the PPP packet that includes a signaling channel, enhanced PPP, encapsulated within an HDLC frame, within an L2TP packet, or within an ATM cell using AAL5 adaptation. (Araujo, col. 8, ll. 5-16; col. 10, ll. 28-46).

Therefore, Araujo describes network access equipment used to provide an end user such as the host of Walton access to the internet. Furthermore, Araujo describes the use of enhanced PPP to accomplish delivery of a multicast message similar to that disclosed as prior art in Applicants application as illustrated in **Figure 1** and disclosed in paragraphs [0008] and [0009]. In other words, an access multiplexer receives a multicast message as a single feed and distributes the multicast message as many unicast messages to the many users served by the access multiplexer. (Araujo, col. 14, ll. 49-54; col. 15, ll. 9-13). This would create the extra bandwidth between the access multiplexer and the user that Applicant's

claim 1 prevents by using a single PPPoE multicast session from a network element to a consumer premise equipment.

A signaling channel in PPP is not a PPPoE multicast capable tag in a PADR. Moreover, using a signaling channel in PPP "to distribute a single stream from the ISP to the concentrator/multiplexing equipment and have that equipment distribute the multicast data to individual subscribers," (Araujo, col. 14, ll. 49-54), relies on unicast messages between the concentrator/multiplexing equipment and the individual subscribers. Therefore, the system of Araujo is not transmitting the multicast traffic as PPPoE multicast traffic in a single PPPoE multicast session from a network element to a consumer premise equipment.

Similar to Araujo, Owens describes network access equipment to provide an end user, such as a host of Walton, access to the Internet. Owens describes a computer implemented method for provisioning broadband service in a Point-to-Point Protocol over Ethernet (PPPoE) network. A PPPoE session is established, and a username is randomly chosen from a list of usernames stored on a modem. An authentication request is then transmitted from the modem to a Broadband Remote Access Server (BRAS) over a PPPoE network. The modem receives authorization from at least one of multiple Broadband Service Nodes (BSNs). (Owens, Abstract).

Owens fails to describe a PPPoE multicast capable tag in a PADR. Owens describes a modem sending a PADR packet to a BRAS in the process to establish a PPPoE session. Owens further describes this PPPoE session is unicast. (Owens, col. 9, 23-24). This use of a PADR packet is similar to that disclosed in Applicants'

Background section in paragraph [0008] and illustrated in **Figure 2**. That is, the PADR packet is used in a PPPoE system that does not support multicast capabilities over PPPoE. Because Owens only describes the PADR in a unicast session, Owens fails to describe or suggest a PPPoE multicast capable tag in a PADR and a PPPoE multicast session from a network element to a consumer premise equipment.

Applicants respectfully submit that the references lack the proper motivation to combine characteristics of network access equipment of Araujo and Owens with the end user of Walton as indicated in the Office Action. Specifically, the Office Action is combining the features of network access equipment used to connect end users to the internet (Araujo and Owens) into a host (end user) on a subnetwork.

Therefore the combination of Walton, Araujo, and Owens describes a Myrinet subnetwork providing a wormhole multicasting scheme according to Walton connected to a network according to Araujo and Owens for access to the Internet. An access multiplexer according to Araujo receives a multicast message as a single feed and distributes the multicast message as many feeds to the many users including the computer on the Myrinet subnetwork. The computer on the Myrinet subnetwork receives a multicast message and distributes the messages to all the computers in a multicast cycle as described in Walton.

Since the network running enhanced PPP is not a PPPoE network, a secondary PPPoE network according to Owens is connected to a computer in the Myrinet subnetwork according to Walton. The second computer and network then use provisioning of the broadband service of the PPPoE network according to

Owens, as described above.

The combination fails to describe or suggest at least the above limitations of claim 1 because each of the references fail to describe or suggest individually or in combination a PPPoE multicast capable tag in a PADR and transmitting multicast traffic as PPPoE multicast traffic in a single PPPoE multicast session from a network element to a consumer premise equipment coupled to the PPPoE client.

#### *Claims 2-6*

Applicants respectfully submit that claims 2-6 are dependent directly or indirectly on claim 1, thus include the same limitations as claim 1. As such, claims 2-6 are patentable for at least the same reasons as claim 1.

#### *Claims 7 and 34*

Claims 7 and 34 as amended require a similar limitations as discussed above for claim 1. Therefore, claims 7 and 34 are not rendered obvious by the combination for at least the reasons discussed above in claim 1.

#### *Claims 8-12*

Applicants respectfully submit that claims 8-12 are dependent directly or indirectly on claim 7, thus include the same limitations as claim 7. As such, claims 8-12 are patentable for at least the same reasons as claim 7.

*Claims 35-37*

Applicants respectfully submit that claims 35-37 are dependent directly or indirectly on claim 34, thus include the same limitations as claim 34. As such, claims 35-37 are patentable for at least the same reasons as claim 34.

*Claim 13*

Claim 13 requires a control engine to receive a PPPoE multicast capable tag in a PPPoE active discovery request (PADR). Claim 13 also requires a forwarding engine to transmit the PPPoE encapsulated multicast packet as a single PPPoE multicast session between a consumer premise equipment coupled with a plurality of hosts and the network element.

Paragraph 9 of Applicants' Background of the Invention discloses an access concentrator 111 that generates IP multicast packets for each of the established PPPoE unicast sessions, encapsulates the generated IP multicast packets with PPPoE where each IP multicast packet's PPPoE encapsulation includes an identifier for the corresponding PPPoE unicast sessions and each of the generated IP multicast packets also include an identifier for the unicast Ethernet address of the corresponding one of the hosts 101, 103, and 105. Moreover, the access concentrator can additionally encapsulate the PPPoE encapsulated IP multicast packets with a delivery protocol (e.g., ATM).

As discussed above, the combination of Walton, Araujo, and Owens fails to describe or suggest a PPPoE multicast capable tag in a PADR. Similarly, Applicants' paragraph 9 fails to disclose a PPPoE multicast capable tag in a PADR.



Therefore the combination of Walton, Araujo, Owens, and Applicants' paragraph 9 fail to suggest or describe a control engine to receive a PPPoE multicast capable tag in a PADR as required by claim 13.

Furthermore, the combination Walton, Araujo, and Owens fails to describe or suggest a PPPoE multicast session from a network element to a CPE, as discussed above. Paragraph 9 discloses using many PPPoE unicast sessions for transmitting an multicast message, thus failing to describe a PPPoE multicast session from a network element to a CPE. Therefore, the combination fails to describe a forwarding engine to transmit the PPPoE encapsulated multicast packet as a single PPPoE multicast session between a consumer premise equipment coupled with a plurality of hosts and the network element. For at least the above reasons, the combination fails to render claim 13 obvious.

#### *Claims 14-16*

Applicants respectfully submit that claims 14-16 are dependent directly or indirectly on claim 13, thus include the same limitations as claim 13. As such, claims 14-16 are patentable for at least the same reasons as claim 13.

#### *Claim 21*

Claim 21 includes similar limitations as claim 13. Specifically, Claim 21 requires a network element to receive a Point to Point Protocol over Ethernet (PPPoE) multicast capable tag in a PPPoE active discovery request from a plurality

of hosts coupled to the CPE and to transmit the multicast's PPPoE encapsulated traffic as a single PPPoE multicast session to the CPE.

Therefore, the combination fails to describe or suggest at least the above limitations of claim 21 for at least the reasons discussed for the similar limitations of claim 13.

#### *Claims 22-27*

Applicants respectfully submit that claims 22-27 are dependent directly or indirectly on claim 21, thus include the same limitations as claim 21. As such, claims 22-27 are patentable for at least the same reasons as claim 21.

#### *Claim 17*

Claim 17 requires a PPPoE module to indicate multicast capability with a PPPoE multicast tag in a PPPoE active discovery request (PADR).

O'Dell describes an approach for providing multi-user access to a packet switched network via a shared Ethernet-based local area network. (O'Dell, Abstract). O'Dell describes user stations connected to a local area network (LAN) using Point-to-Point Protocol (PPP) encapsulated using the Ethernet-based LAN protocol. (O'Dell, Abstract). The packets are then transmitted by a customer premise equipment (CPE) to a digital subscriber line (DSL) access multiplexer that transports the multiple PPP sessions from the users to a multiplexer/demultiplexer, such as an asynchronous transfer mode (ATM) switch. (O'Dell, Abstract). The ATM switch transports the multiple PPP sessions over a single permanent virtual circuit

and the PPP sessions are terminated at a remote access server that forwards the packets to a backbone router. (O'Dell, Abstract). The backbone router then forwards the packets to a packet switched network. (O'Dell, Abstract).

O'Dell fails to describe or suggest a PPPoE module to indicate multicast to indicate multicast capability with a PPPoE multicast tag in a PPPoE active discovery request (PADR). Furthermore, the combination of Walton, Owens, and Araujo, as discussed above fails to describe or suggest a PPPoE multicast tag in a PADR. Therefore, the combination of Walton, Owens, Araujo, and O'Dell fails to describe or suggest the above limitation of claim 17. Thus, the combination fails to render claim 17 obvious.

#### *Claims 18-20*

Applicants respectfully submit that claims 18-20 are dependent directly or indirectly on claim 17, thus include the same limitations as claim 17. As such, claims 18-20 are patentable for at least the same reasons as claim 17.

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Conclusion

If the allowance of these claims could be facilitated by a telephone conference, the Examiner is invited to contact the undersigned at (408) 720-8300. If there are any additional charges, please charge our Deposit Account No. 02-2666.

Respectfully submitted,

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